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WORKING PAPER:

THE URBAN INSTITUTE
WASHINGTON, D.C.

3839-02-02 February 1990

MEDICARE ASSIGNMENT RATES AFTER THE PHYSICIAN PARTICIPATION PROGRAM

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DHCD 463

This research was supported by Grant No. 17-C-99222/3-01 from the Health Care Finance Administration. Opinions expressed are those of the authors and do not necessarily represent the views of The Urban Institute or its sponsors. The authors would like to thank Stephen Zuckerman for comments on earlier drafts.

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I. INTRODUCTION

Regulatory Environment

Since its inception Medicare has been committed to insuring access to care to all elderly participants. One feature of the physician part of the program, known as Part B, designed to increase access, is the physician assignment option. Under this option, physicians can only receive the Medicare approved fee, called the 'reasonable charge' or the 'allowed charge'. Physicians bill Medicare directly for Medicare's portion of their fees, and bill patients for deductibles and the 20-percent coinsurance. Alternatively, physicians can collect their fees from their patients, but may 'balance bill' patients and charge fees in excess of the Medicare allowed charges. In this option, Medicare reimburses the patient, not the physician.

In recent years, however, policymakers have become increasingly concerned about rising costs. These concerns led to a new emphasis on cost containment, and appropriate use of services to new policy initiatives. This culminated in the adoption of the several physician payment reform initiatives under the Omnibus Budget Reconciliation Act (OBRA) of 1989. As a result, the Medicare reimbursement mechanism will change dramatically in 1992 when a new Medicare fee schedule based on a relative value scale (RVS) will replace the customary and prevailing charge methodology. Reimbursement for most surgical procedures, for instance, will decline while payments for medical care services will increase. In addition, a geographic cost index will be applied, resulting in increases in fees in some areas, and decreases in others.

The main objective of this study is to explain the growth in assignment rates between 1983 and 1985, a period in which critical changes in policy were

made. In addition, it seeks to provide preliminary insights about potential impact RVS will have on assignment rates.

Under the Deficit Reduction Act (DEFRA), enacted in July 1984, Congress imposed a 15-month fee freeze on Medicare services and modified the assignment option. Prior to DEFRA, all physicians could accept assignment on a case-by-case basis. DEFRA introduced a participation agreement, beginning in October 1984 and renewable on an annual basis. Physicians who signed the agreement agreed to accept all Medicare patients and services on assignment. Nonparticipating physicians retained the option of balance billing, and accepting assignment on a case-by-case basis. To encourage participation, the legislation offered both a carrot and a stick. In the case of participating physicians, the fee freeze applied only to the Medicare approved charges, but not to charges physicians actually submit to Medicare. While the submitted charges are not payable, they can be used to update the approved charges in future years.[1] For nonparticipants, the fee freeze applied to submitted charges as well as allowed charges.

Under OBRA 1989, physicians will continue to have the participation option, but with a new structure of incentives. Nonparticipating physicians will be paid only 95 percent of the Medicare fee schedule amount. Although they will still be able to balance bill, they will face severe limitations on the amount they charge patients over the Medicare fee.[2]

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1. The allowed charge per service is the lowest of three price measures: (1) the actual charge made by the physician, (2) the physician's median charge for the previous year ("customery" charge) (3) the Medicare prevailing charge in the locality, based on the 75th percentile of all customery charges. Submitted charges can affect future Medicare payments via the customery charge.

2. Both the fee schedule and the limits on balance billing will phased in gradually. By 1993, the limit on balance billing will be 115 percent of the Medicare payment amount for nonparticipating physicians.

Measuring the Assignment Rate

The assignment rate, defined as the the percent of all allowed charges that were assigned, was just over 50 percent and stable in the period that preceded DEFRA. However, between 1983 and 1985 the assignment rate rose dramatically from 54 percent to 68 percent (McMillan et al., 1985). Our results show that this growth occurred in all major medical specialties (see Table 1). With only 30 percent of U.S. physicians signing the participation agreement, only part of the increase can be attributed to participation. While this has not been documented, it would appear that assignment rates among nonparticipating physicians also rose. This study focuses on the growth in joint assignment rates of participants and nonparticipants alike in market areas. The data construction is described in section II. The methodological approach for analyzing aggregate assignment rates is discussed in section III. The following sections present the empirical specification, regression results, and finally, the conclusions.

II. DATA SOURCES

The data base for this study was created by the Urban Institute, using varied sources. The units of observation are "market areas" which include MSAs, and rural parts of each state, and the base year is 1985. The majority of variables came from Health Care Finance Administration (HCFA) data files. Information on assignment rates, submitted charges, and allowed charges, by type of service came from the BMAD file. This file contains information for a 5 percent random sample of all Medicare beneficiaries. Medicare enrollee counts and distribution by age, sex, and race came from Health Insurance

Table 1

Mean Area Assignment By Specialty[a]

	1983	1985
General and family practice	.42	.61
Internal Medicine	.45	.61
Ophthalmology	.38	.64
Orthopedics	.43	.57
General surgery	.51	.65
Cardiology	.50	.65
Radiology	.54	.68
Other Specialties	.51	.65
Total	.48	.64

a. Based on a sample of 290 Metropolitan Statistical Areas and 44 rural parts of states. Means are weighted by enrollee population in the area.

Eligibility Write-off (HISKEW) file. The number of Medicare beneficiaries enrolled in HMOs was obtained from HCFA's Average Adjusted Per Capita Cost (AAPCC) file. Non-HCFA data sources included a Bureau of Census file, which provided unemployment figures, American Medical Association files, which provided physician-population ratios, and the Consumer Population Survey (CPS), from which imputed values of elderly income and supplementary insurance availability were drawn. The physician practice cost index was developed by Zuckerman et al. (1989). It is based on the value of three classes of inputs: the physician's own time, practice expenses and overhead, and malpractice insurance. A version of this index has been adopted under OBRA 1989 as part of the physician payment reform (one modification is that only a quarter of the variation in the the physician own-time component would be included in the new index). A prevailing charge index for this study was constructed for selected medical, surgical and radiology procedures, weighted by national expenditure shares. The data for this index came from the Medicare Directory of Prevailing Charges.

There were 290 MSAs, and 44 rural areas with complete data. The same data base was tested and successfully used in a previous Urban Institute study (Holahan et al. 1989).[3]

III. METHODOLOGY

The theoretical considerations for analyzing physician assignment behavior were previously described by Sloan et al. (1978), Paringer (1980), Mitchell and Cromwell (1982), and Rodgers and Musacchio (1983). The physician is described

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3. Areas excluded due to poor quality of the data include Yakima, Washington; La Cross, Sheboygan, and Madison, Wisconsin; Iowa City, Iowa; Rochester, Minnesota; rural New Jersey and Rhode Island; and all of Connecticut, Missouri, West Virginia, and Ohio.

as facing a segmented market comprised of private patients and Medicare assigned patients.[4] In the private market, which includes both private pay patients and nonassigned Medicare patients, the physician is viewed as a price setter. In the assigned market, prices are fixed by Medicare. Thus, both the private price and the Medicare price are counted as determinants of the assignment decision, along with measures of competition and other market conditions. In addition, assignment behavior will depend on practice costs, collection costs, and physician attitudes towards government regulation. Rodgers and Musacchio (1983) extended the theory to include physician uncertainty about payment in the private market. The physician bases his subjective assessment of the probability of collection (or the complimentary probability of payment default) on the patient's characteristics and ability to pay. The higher (lower) this subjective probability the lower (higher) the likelihood of accepting assignment. Since the subjective probability is not observed, the patient characteristics enter the model as proxies.

Empirically, these and other studies have focused on the Medicare assignment rate behavior before the participation agreement came into being (Cromwell and Mitchell, Rodgers and Musacchio, and Rice and McCall, 1983), or on the participation behavior after the agreement was introduced (Mitchell et al. 1988). For participants, only the participation decision matters, because 100 percent of all claims are accepted on assignment. On the other hand, the assignment decision itself is the relevant issue for nonparticipants.

In a physician-based study, a variety of selectivity bias models that control for the probability of participation would be appropriate. However, as

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4. The theory is easily extended to include Medicaid assigned patients, without affecting the basic theoretical results.

stated earlier, this study is based on area aggregates rather than individual physicians. Furthermore, the data did not allow us to separate the assignment rates of participants and nonparticipants. With aggregation, assignment behavior in the period that follows the agreement can be expressed as the following function:

$$A_t = f_1(p,g,c,P_t) \quad (1)$$

where A_t is the area assignment rate in the post-agreement period, p is a vector of prices, g is the subjective payment probability, c is a vector of practice costs and collection costs, and P_t is the contemporaneous area participation rate. The participation rate can be similarly described

$$P_t = f_2(p,g,c,A_{t-1}) \quad (2)$$

The participation function has the same determinants as the assignment function with one additional determinant, A_{t-1}, which is the assignment rate in the pre-agreement period. The latter variable is included because physicians who have had high assignment rates in the past, are more likely to view participation as an attractive package.

Estimation of equation 1 requires creating an instrument for P_t. In practice, this would be difficult to identify econometrically since the only variable in eqn (2) that is excluded from eqn (1) is the lagged assignment rate. Therefore the analysis used in this study is based on the reduced form obtained from substituting eqn (2) into eqn (1).

$$A_t = f_3(p,g,c,A_{t-1}). \quad (3)$$

The coefficients obtained from this procedure can be viewed as upper-bound estimates for nonparticipating physicians.[5]

Including a lagged assignment term in the model introduces a time ("dynamic") dimension not present in the earlier studies cited above. These studies focused on cross-sectional effects. Regressions based on the dynamic model may be viewed as explaining growth in assignment rates, during the pre-agreement and post agreement period.[6] If all areas experience the same growth

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5. To show this, let the structural aggregate assignment equation be

$$A_t = a_0 + a_1 X + a_2 P_t$$

and let the structural aggregate participation equation be

$$P_t = b_0 + b_1 X + b_2 A_{t-1}$$

where a_i and b_i are the regression coefficients corresponding to A_t and P_t

Substitution of the P_t equation into A_t yields the reduced form

$$A_t = \alpha_0 + \alpha_1 X + \alpha_2 A_{t-1} \text{ where } \alpha_1 = a_1 + a_2 b_1 \text{ and } \alpha_2 = a_2 b_2$$

A reasonable assumption is that X affects A_t and P_t in the same direction. For positive effects, the reduced form coefficient, α_1, always exceeds the value of the structural coefficient a_1.

6. Note that the last equation in footnote 5 can be rewritten as follows:

$$A_t - A_{t-1} = \alpha_1 + \alpha_2 X + (\alpha_2 - 1) A_{t-1}.$$

This is a difference equation, holding initial assignment rates constant, and can thus be interpreted as a rate of growth equation. Somewhat more complex interpretations of dynamic models are the partial adjustment equilibrium model and the Koyck distributed lag model which can be used to obtain separate short-run and long-run effects. However, appropriateness of these models in analyzing cross sectional data bases is debatable, and their use will not lead to additional policy insights. Therefore the discussion in the text refer to the more general interpretation of a difference or growth equation.

rate during this period, the lagged dependent variable will be the only significant explanatory variable in the regression. On the other hand if areas experience different rates of growth during this period, other variables will be significant.

IV. EMPIRICAL SPECIFICATION

The empirical analysis was based on area aggregates. This is a departure from the previous studies cited in this paper, which were all based on surveys of individual physicians. While survey based samples may shed better light on individual decision-making and behavior, appropriately specified area-based studies have the advantage of being closely linked to the regulatory environment imposed by policy makers. This is particularly true in the case of Medicare, which uses area based data on actual charges to establish its reimbursement rates.

The analysis was performed at first on the overall assignment rate, computed from all physician services. Among the independent variables, which are described in detail below, are similar area-based price and cost indices. Thus the results can be used to gauge the degree of influence that Medicare can exert on assignment rates in the market. To test whether the results would vary by type of service, the analysis was repeated for assignment rates of all medical services and all surgical services.

Variable definitions and summary statistics are given in Table 2. A more detailed description of variable construction, hypotheses and institutional background is given below.

Dependent Variables

The assignment rates used in this study are area proportions between zero and one. The dependent variable can be thought of as the probability of accepting assignment in the area. It is well known that when the dependent variable is a probability, ordinary least squares yield biased estimates, and nonlinear techniques such as the logistic regression are required. However, Maddala (1983) shows that when the units of observations are area aggregates with arbitrarily large sample sizes, a linear transformation of the logit model yields unbiased estimates. The dependent variable is defined as the natural logarithm of the ratio of probabilities ("log-odds ratio").

$$\ln[\pi/(1-\pi)] = \beta_o + \Sigma\beta_i x_i$$

where π is the assignment rate, a is a constant, β_i is the coefficient of the i'th explanatory variables, and x_i is the i'th explanatory variable. The weights are given by $[n\pi(1-\pi)]^{1/2}$, where n is the number of Medicare enrollees in the area. Separate dependent variables, expressed as the log-odds assignment ratio in the each MSA or rural part of each stae were created for total services, medical services and surgical service.

Independent Variables

Demography. Demographic traits may affect the physician's assessment of the likelihood of payment. These variables, expressed as percentages of Medicare enrollees, represent age (AGE1, AGE2, AGE2), sex (MALE), and race (BLACK). In addition we include the mortality rate of Medicare enrollees (MORT); Mitchell and Cromwell (1982) argue that in localities with relatively high elderly mortality rates, individual physicians are more likely to accept

Table 2

Variable Definitions[a] and Summary Statistics

Variable Name	Definition	Mean	Standard Deviation
Dependent Variable			
Assign 85	Log odds assignment ratio, 1985	.53	.86
Independent Variables			
Demography and Ability to Pay			
AGE1	Percent of Medicare enrollees under 65	.13	.02
AGE2	Percent of Medicare enrollees age 65–74	.53	.04
AGE3	Percent of Medicare enrollees age 75–84	.28	.03
MALE	Percent of males among Medicare enrollees	.44	.49
BLACK	Percent of black males among Medicare enrollees	.09	.11
MORT	Medicare population mortality per 1000 (1984)	.86	.49
INCOME	Mean elderly income per capita	12,299.97	1,256.54
SUPP	Percent of Medicare enrollees with Supplementary insurance	70.33	5.44
UNEMPLOYED	Unemployment rate by state	7.35	1.64
Prices and Costs			
PCI	Medicare prevailing charge index	1.03	.15
SUBALL	The ratio of predicted submitted charges to allowed charges.	1.37	.06
COST	Practice cost index	1.05	.14
Physician Attitudes			
REAGAN	Percent residents voting for Reagan in 1984	51.59	5.62

Table 2 (continued)
Page 2

Variable Name	Definition	Mean	Standard Deviation
Market Structure			
SPEC[b]	Number of MD specialists per 1000 population	1.07	.41
GP[b]	Number of MD general practitioners per 1000 population	.23	.07
HOSPITAL	Number of hospital-based physicians (residents and interns) per 1000 population	.31	.35
HMO	Percent HMO patients in total Medicare population	.03	.05
ENROLLEE	Number of Medicare enrollees per 1000 population	12.21	3.59
Location			
URBAN_S	Dichotomous variable that is equal to 1 if market area is a small Metropolitan Statistical Area (MSA) with population less than or equal to 250,000	.42	.49
URBAN_M	Dichotomous variable that is equal to 1 if market area is a medium MSA with a population that is greater than 50,000 but less than or equal to 1,000,000	.32	.47
URBAN_L	Dichotomous variable that is equal to 1 if market area is a large MSA with more than 1,000,000 population	.13	.33
Lag term			
ASSIGN 83	Log - odds assignment ratio, 1983	-.30	-2.12

a. Variables are 1985 aggregates for MSAs and rural parts of states unless otherwise indicated.

assignment because of their need to ensure payment from elderly persons expected to die soon. For the same reason, we expect to find a positive association between mortality rates and area based assignment rates.

Ability to Pay. Two variables measure ability to pay: elderly per capita income (INCOME) and supplementary insurance coverage (SUPP). Medicare provides equal coverage to all enrollees, i.e., 80 percent of all allowed charges minus the deductible. Many enrollees have supplementary insurance policies to cover coinsurance payments. Holding income constant, supplementary insurance will result in a greater ability to pay, because it lowers beneficiary out-of-pocket spending. Both INCOME and SUPP are expected to be positively associated with the assignment rate. The regressions also include the area unemployment rate (UNEMPLOYED). It was initially thought that this variable reflects ability to pay and payment probability of non-Medicare patients. In high unemployment areas, physicians may view non-Medicare patients as riskier payers, leading to a preference for assigned patients. Therefore unemployment was expected to have a positive effect on assignment. However, as shown in section V, all of the regressions yielded negative effects, suggesting that unemployment is a proxy for other sources of area variation in assignment.

Prices. Two proxy variables were used to represent the Medicare price and the relationship between private and Medicare prices (PCI and SUBALL, respectively). PCI is the prevailing charge index described in the data section, which is computed for a fixed bundle of representative services. Separate prevailing charge indices were computed for total, medical, and surgical services.

For private prices, it was possible to define proxy variables that correspond to each of the three categories, using the ratio of submitted

charges to Medicare payments. In general, physicians submit the standard, private fee to Medicare for all services, regardless of whether they are assigned or nonassigned claims. Medicare then makes the determination of allowed charges. Thus, the physicians submitted charges and allowed charges refer to the same mix and quantity of services. Therefore, this ratio can be viewed as an index of relative private prices, holding the "basket" of services constant. Since the physician is viewed as a price setter in the private market, submitted charges were treated as endogenous in the regressions. Their predicted values were based on an array of geographic dummy variables and on the prevailing charge index.

Costs. Previous studies did not control for practice costs (Rodgers and Musacchio, Rice and McCall) or have relied on proxy variables (Mitchell and Cromwell, 1988). In this study we use a practice cost index (COST), that reflects geographic variations in the costs of major inputs used by the physician. High practice costs make the Medicare approved payment less attractive, thus reducing the likelihood of accepting assignment. Thus the anticipated sign of COST in the regression is negative. No information about collection costs was available.

Physician Attitudes. Since physician attitudes were not directly observable from the data, the percent of the population voting for Reagan in the 1984 presidential elections was used as a measure of political conservatism. The hypothesis is that in more conservative areas, physicians will tend to be less amenable to accepting government regulation in the form of assignment, despite the incentives offered.

Market Structure. The first variable that reflects area competition and market structure is the physician-to-population ratio. The theoretical models

cited in section III posit excess demand by Medicare recipients under the Medicare fixed-fee regime. As the physician-to-population ratio rises, the pool of private patients in the market falls, leading physicians to accept a greater proportion of Medicare enrollees on assignment. The descriptive statistics in table 1, show substantial variation in assignment across specialties. Thus, in the total assignment regression the impact of the physician specialty mix is worth investigating. For this reason all of the assignment regressions include two physician-population ratios, SPEC, which is based on the number of physicians in all medical and surgical specialties, and GP, which is based on the number of general practitioners. Cromwell and Mitchell (1986) show that if markets for physician services are in equilibrium, physician-population ratios are endogenous. To correct for possible simultaneous equation bias in the assignment regressions, a two stage least squares estimation procedure was used. Instrumental variables for GP and SPEC is this procedure were estimated from all of the the exogenous variables in the assignment regression, as well as supply shifters such as professional wages in the area and measures of the availability of medical facilities.

The next market structure variable is the ratio of Medicare enrollees to population (ENROLLEE). The interpretation of this variable is similar to that of the physician-to-population ratio. Higher values of ENROLLEE imply lower demand in the private market, thereby increasing the likelihood of assignment.

Two variables reflect alternatives to private practice physicians available to patients. These are the ratio of hospital based physicians to the population (HOSPITAL), and the ratio of Medicare HMO enrollees to total enrollees (HMO). Two effects, operating in opposite directions are associated with HOSPITAL. If hospital based physicians are substitutes for private

practice physicians, the availability of hospital based care may reduce private demand. This would lead to higher assignment rates. On the other hand, hospitals may attract relatively poor patients, with private practitioners treating higher income patients. This would lead to lower assignment rates. Thus the sign of HOSPITAL in the regressions is ambiguous.

The assignment decision is not relevant to HMOs, because Medicare reimburses them by capitation. However, there is strong evidence of 'adverse selection' (Brown, 1988, Wilenski and Rossiter, 1986) whereby HMOs enroll relatively healthy Medicare patients, leaving private practitioners with the sicker Medicare patients. As mentioned previously, the less healthy the patient, the greater the likelihood of assignment. An alternative hypothesis is that increased competition from HMOs makes physicians more willing to accept assignment.

Location. Location dummy variables are used to allow for varying intercepts for large urban areas, (URBAN_L), mid-sized urban areas (URBAN_M), and small urban areas (URBAN_S), with rural areas as the omitted category. These variables serve as controls for geographic cost of living differences not picked up by the private and public price variables. In addition, they may capture other sources of variation not explained by the regression model.

Lagged Dependent Variable. The absence of information on participation rates is a liability. However, the assignment rate in the period preceding the the participation agreement is likely to be a strong predictor of omitted participation rates in 1985. Presumably, the incentives to participate that were offered in the participation agreement appealed more to physicians with initially high assignment rates, and less to physicians who were reluctant to accept assignment to begin with. Thus, the higher the past assignment rate,

the higher the likelihood to participate. For this reason the log-odds assignment ratio in 1983 was also included among the explanatory variables.

Including a lagged dependent variable in the regression may bias the coefficients because of its potential correlation with the regression error term. Usually when an independent variable and the error term are correlated, an instrumental variable procedure is used. However, the correct instrument for the lagged dependent variable would depend on the complete array of lagged independent variable. Including this instrument in the regression would result in multicollinearity. Since replacing one source of bias with another would not lead to improved estimates, the instrumental variable approach was rejected. To test for the direction and severity of the bias using the raw lagged dependent variable, a statistical procedure suggested by Corman and Grossman (1985, pp. 226-227) was used. The results indicated that the bias was minimal.[7]

V. RESULTS

General Assignment Behavior

Regression results from the assignment regression based on the overall assignment rate, i.e., the rate obtained from all medical services, are shown in Table 3. In addition to coefficient estimates, the table contains elasticities for continuous variables and marginal effects for dummy variables.

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7. Corman and Grossman show that because of the positive covariance between the lagged dependent variable and the error term, the coefficient of the lagged dependent variable will be overstated, while the direction of the biases of the coefficients of other variables depends on the correlation between that variable and the lagged term and the above covariance term. The coefficient of a variable with a negative partial correlation will be upward biased while the coefficient of a variable with a positive partial correlation will be downward biased. The covariance term was 0.020, while partial correlation terms ranged from 0.33 to 0.02 in absolute value.

Table 3

Regression Analysis for Total Medicare Assignment

	β	(t)	Elasticity [a]	Marginal Effect
Demography and Ability to Pay				
AGE1	-2.82	(-1.47)	-0.13	
AGE2	-0.82	(-0.50)	-0.16	
AGE3	-4.80	(-2.25)	-0.50	
MALE	1.35	(0.78)	0.21	
BLACK	0.12	(0.33)	0.04	
MORT	0.09	(1.85)	0.16	
INCOME	.02E-3	(0.74)	0.09	
SUPP	.05E-1	(1.31)	0.12	
UNEMPLOYED	-0.04	(-2.07)	-0.11	
Prices and Costs				
PCI	0.40	(2.41)	0.16	
SUBALL	-.10E-2	(-0.07)	-0.05E-2	
COST	-1.22	(-4.10)	-0.47	
Physician Attitudes				
REAGAN	-0.01	(-2.62)	-0.18	
Market Structure				
SPEC	-0.17	(-1.72)	-0.06	
GP	0.89	(2.27)	0.07	
HOSPITAL	0.08	(0.73)	0.01	
HMO	3.65	(1.65)	0.07	
ENROLLEE	0.02	(2.38)	0.09	
Location				
URBAN_SM	0.29	(2.82)		0.07
URBAN_MD	0.34	(3.59)		0.08
URBAN_LG	0.32	(2.70)		0.07
ASSIGN 83	0.87	(23.36)		
CONSTANT	-9.46	(-0.27)		
F	47.82			
R^2	0.78			

a. The marginal effect for the i'th variable is given by $\partial\pi/\partial X_i = \beta_i(1-\pi)\pi$; the corresponding elasticity is given by $E = \beta_i X_i(1-\pi)$

All of the age variables had negative coefficients but only the coefficient of AGE3 was significant. This consistently negative association between assignment rates and relatively young age groups means that assignment rates increased more in areas with older populations. The only other demographic variable with a significant coefficient was MORT, which had the expected positive sign. Taken together, the results imply that physicians are indeed more willing to accept assignment when health status is worse or the likelihood of death is high. However, the ability to pay variables that are positive indicators of the collection probability were not significant. Contrary to expectations, the coefficient of UNEMPLOYED was negative (and was significant at the 90 percent level). The coefficient of REAGAN was negative and highly significant, confirming expectations about the relationship between political conservatism and the growth in assignment rates.

The Medicare price variable, PCI, had the expected positive sign and was highly significant, while the private fee proxy measure, SUBALL, had no impact on assignment. Thus, holding practice costs constant, higher (lower) Medicare prices lead to higher (lower) growth in assignment rates. The elasticity of the assignment probability with respect to PCI calculated at the sample mean was .16. The same result, namely that the Medicare price, not the private price is a key predictor of assignment, was also found by Mitchell et al. However, the lack of significance of the private price in both studies may due to poor proxy measures (Mitchell et al. used the Blue Shield fee for a follow-up office visit).

The coefficient of COST was highly significant, and had the expected negative sign, indicating that as practice costs rise physicians find assignment, with its caps on fees, less attractive. Judging from the cost

elasticity, which was -.47, it would appear that the assignment decision is more sensitive to practice costs than to the level of payments. For example, the cost elasticity was 3 to 4 times greater, in absolute value, than the prevailing charge elasticity. The elasticity calculations for total services imply that overall, a 10 percent increase in Medicare fees results in less than a 2 percent increase in assignment rates, while a 10 percent increase in practice costs results in nearly a 5 percent decrease in assignment rates. This result has important implications for Medicare policy, which will be further explored in the next section.

Although specialists display somewhat higher assignment rates than general practitioners, the SPEC variable was negatively associated with assignment growth, and the GP variable was positively associated with assignment growth. The latter result can be explained using the interpretation of SPEC and GP as measures of competition. The higher the GP-population ratio, the keener the competition over private patients, and the higher the likelihood of assignment. All else equal, specialists may be less sensitive to competition, presumably because they face relatively inelastic private demand curves. The other significant market structure variables are ENROLLEE and HMO. Both variables display the expected positive coefficients.

Finally, all of the urban dummy variables were positive and significant. These results were expected, given that raw data showed consistently lower assignment rates in rural areas. The regression results indicate that even when much of the variation in growth rates is accounted for, assignment rates grew faster in urban areas than in rural areas.

Type of Service Regressions

Coefficients from the medical services and surgical services regressions are shown in Table 4. In general, the signs of the coefficients in both cases are consistent with signs found in the overall assignment regression, and the results are qualitatively similar. The results for the price and cost variables were usually consistent with results in the overall assignment rates. An exception is found in the coeffcient of PCI, which was significant in the overall assignment rate regression (at the .99 confidence level) and in the surgery regression (at the .90 confidence level), but not significant in the medical regression (recall that separate values for PCI were calculated for each of the regressions). The impact of SUBALL was consistently negligible in all of the regressions, while COST had a consistently negative and highly significant effect on assignment rates.

The most noticeable differences between the two regressions are related to the statistical significance of certain variables. For instance, all three variables representing age cohorts were statistically insignificant in the surgery regression while two of these variables AGE1 and AGE2 were significant in the medical services regression. The market structure variables (HOSPITAL, HMO, ENROLLEE) are significant in the medical services regression but not in the surgery regression, while UNEMPLOYED and GP are significant in the surgery regression but not in the medical regression.

Table 4

Regression Analysis for Medicare Assignment
by Type of Service

	Medical		Surgical	
	β	(t)	β	(t)
Demography and Ability to Pay				
AGE1	-4.56	-2.24	-1.91	-0.81
AGE2	-1.83	-1.06	-1.13	-0.56
AGE3	-7.12	-3.22	-3.79	-1.49
MALE	0.38	0.22	2.40	1.19
BLACK	-0.07	-.17	0.54	1.25
MORT	0.07	0.97	0.06	0.73
INCOME	0.04E-3	1.42	-0.01E-3	-0.37
SUPP	0.008	1.94	0.002	0.53
UNEMPLOYED	-0.03	-1.58	-0.06	-2.81
Prices and Costs				
PCI	0.25	1.40	0.29	1.89
SUBALL	0.002	0.20	-0.004	-0.21
COST	-0.92	-3.12	-0.96	-2.73
Physician Attitudes				
REAGAN	-0.01	-2.52	-0.01	-2.82
Market Structure				
SPEC	-0.33	-2.22	-0.32	-1.87
GP	0.09	0.10	2.13	2.24
HOSPITAL	0.26	2.00	0.08	0.54
HMO	6.20	2.84	2.62	1.09
ENROLLEE	0.02	2.73	0.008	0.80
Location				
URBAN_SM	0.24	2.04	0.48	3.53
URBAN_MD	0.24	2.12	0.54	4.10
URBAN_LG	0.17	1.17	0.62	3.81
ASSIGN 83	0.90	20.07	0.80	20.64
CONSTANT	10.47	0.27	-51.06	-1.19
F	40.07		37.07	
R^2	0.75		0.74	

VI. CONCLUSION

This study differs from previous analyses of assignment rates in two major respects. First, it analyzes aggregate assignment rates in market areas, rather than at the individual physician level. Secondly, it focuses on the growth of assignment rates between 1983 and 1985, a period in which critical policy changes took place, whereas previous studies focused on cross-sectional variations.

Unlike previous studies that ignore physician costs or use proxy measures of costs, this study employs a reliable measure of physician practice costs that has been made available only recently. The results show that practice costs are a very important (negative) predictor of assignment rates.

Another important result is that Medicare fees have a significant effect on assignment rates when all services are included together. In the separate analyses of medical care and surgery assignment rates, Medicare fees were statistically significant only in the latter regression. On the other hand, assignment growth does not appear to be affected by the ratio of private charges to Medicare fees. A similar result was found in cross-sectional analysis of the participation decision in a study by Mitchell et al. Another important policy result common to both studies relates to the dependency of physician practices on Medicare patients, represented by the ENROLLEE variable. The lower Medicare dependency, the lower the assignment rate tends to be. Finally, an important obstacle to physician acceptance of assignment is political conservatism, measured by the REAGAN variable. Presumably, this variable reflects strong anti-regulatory sentiments that remain in place even when financial incentives to accept regulation are offered.

These results have important implications for the effect of recent physician payment reform initiatives on physicians' willingness to accept assignment in Medicare. The results imply that assignment rates are positively related to the level of Medicare fees. In general, fees for surgical procedures will fall. The results presented in this paper suggest that it is highly likely that Medicare assignment rates for surgical procedures will also decline. In addition, fees for most medical care services will increase. Here the results are less clear because the Medicare fee variable was not quite statistically significant in affecting assignment rates for medical care services. Thus, our tentative conclusion is that the increase in medical care fees will not result in a significant increase in assignment rates.

The introduction of the Medicare fee schedule will also change fees in different geographic localities. Some areas will experience increases and others decreases, depending on the current levels of fees relative to the geographic practice cost index. These results indicate that, at least for surgical procedures, if the geographic practice cost index results in further decreases in fees, assignment rates will decline even more. On the other hand, in areas where the geographic practice cost adjustment will increase fees, this will have an offsetting effect on assignment rates for surgical procedures. In contrast, the application of the geographic practice cost index, according to our findings, should not have a major impact on assignment rates for medical care services.

A final implication of these results is that the absolute levels of fees relative to geographic practice costs will be an important determinant of assignment rates in the future. In recent years, the absolute levels of Medicare fees have not kept up with inflation. Given Medicare's current budget

problems, this pattern is likely to continue. These results suggest that if the absolute level of Medicare fees declines relative to practice costs, assignment rates will also decline. It should be noted in closing that the rather severe limits on balance billing legislated as part of the physician payment reform package could have very important effects on physicians' willingness to accept assignment. These impacts cannot be inferred directly from these results.

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